Remarks

The various parts of the Office Action (and other matters, if any) are discussed below under appropriate headings.

Withdrawal of Finality of Last Office Action

The Office Action dated January 22, 2004 was made final by the Examiner. This Office Action, however, was the first action on the merits of the claims. The prior Office Action dated September 24, 2003 only set forth a restriction requirement. Consequently, the Office Action dated January 22, 2004 should not have been final, and the finality thereof should be withdrawn.

Information Disclosure Statement

The attachments to the last Office Action included a copy of the first or three 1449 sheets on which the Examiner had acknowledged consideration of the listed documents. Sheets two and three, however, were not attached to the Office Action, and the undersigned would appreciate receiving a copy of those two sheets on which the Examiner has acknowledged consideration of the listed documents.

Rejection of Claims 12-15

Claims 12-15 were rejected as being unpatentable in view of Cosman U.S. Patent No. 6,006,126. Reconsideration of this rejection is respectfully requested.

Claim 12 recites a calibration process for mapping the angular and spacing positions of referencing cameras. This is accomplished by use of a calibration tool having two reflectors secured at predetermined positions at a known distance away from each other in the viewing range of said cameras. The calibration tool is moved three-dimensionally in the viewing range while several intermediate positions of the calibration tool are mapped by the referencing cameras and the resulting data is converted by means of a computer unit individually into three-dimensional coordinates of the reflectors or calibration tool. From this data the angular and spacing positions of the cameras are determined by means of the computer unit. In this manner the relative positions of the cameras can be determined, i.e., calibrated, or the calibration of the cameras effected by other means can be verified by simply moving the calibration tool in the viewing range of the cameras.

As noted by the Examiner, Cosman discloses a system wherein the position of a probe having index sources (light sources or reflectors) can be computed from two camera views. This is done so that the position of the probe can be related to image data obtained by obtained by a CT or MR scanner. Cosman, however, has not been found to use the probe for the purpose of determining the angular and spacing positions of the cameras. In regard to the positions of the cameras, Cosman states:

> It is clear that the positions of the cameras 204, 205 and 210 may be prearranged and precalibrated as fixed on the bar 230. This may be done and stored by the digitizing unit CD (FIG. 1) so that the cameras point isocentrically to the same location in that their visualization fields are precalibrated and preoriented so that everything within the field has a known calibration. This may also be easily checked by taking the platform 230 off at any given time and putting it on a phantom base or some other jig structure which enables instant calibration of the system. It is also true that the head holder 232 may carry fiducial light sources or fiducial marker points or spots 233A, 233B and 233C so that it may be referenced relative to the cameras and the entire system becomes an integral digitized calibrated system.

Cosman '126, column 8, lines 1-13. There is no mention in this passage of using the probe to effect pre-calibration or pre-orientation of the cameras, nor any mention of using the probe to verify the calibration of the cameras.

The Examiner's attention is directed to Heilbrun, et al. U.S. Patent No. 5,603,318 (of record) which is concerned with calibration of the cameras. The abstract of Heilbrun, et al. reads as follows:

> A method and apparatus for defining the location of a medical instrument relative to features of a medical workspace including a patient's body region are described. Pairs of two-dimensional images are obtained, preferably by means of two video cameras making images of the workspace along different sightlines which intersect. A fiducial structure is positioned in the workspace for defining a three dimensional coordinate framework, and a calibration image pair is made. The calibration image pair comprises two 2D projections from different locations of the fiducial structure. After the calibration image pair is made, the fiducial structure is removed. A standard projection algorithm is used to reconstruct the 3D

framework of the fiducial structure from the calibration image pair. Appropriate image pairs can then be used to locate and track any other feature such as a medical instrument, in the workspace, so long as the cameras remain fixed in their positions relative to the workspace. The computations are desirably performed with a computer workstation including computer graphics capability, image processing capability, and providing a real-time display of the workspace as imaged by the video cameras. Also, the 3D framework of the workspace can be aligned with the 3D framework of any selected volume scan, such as MRI, CT, or PET, so that the instrument can be localized and guided to a chosen feature. No guidance arc or other apparatus need be affixed to the patient to accomplish the tracking and guiding operations.

To effect calibration, Heilbrun et al. uses the fiducial structure shown in Fig. 3A which has four rods with eight fiducial points formed as balls on the rods. During calibration, the fiducial structure is stationary. Heilbrun et al. has not been found to disclose or suggest moving the fiducial structure for calibration or calibration verification purposes.

Withdrawal of the rejection of claims 12-15 is respectfully requested for at least the foregoing reasons.

Rejection of Claims 16-18

Claims 16-18 were as being unpatentable over Cosman in view of Zanakis U.S. Patent No. 5,630,422. By way of the foregoing amendments, claim 16 has been cancelled and thus the rejection is moot so far as concerns claim 16.

Regarding claim 17 which has been rewritten in independent form, the claimed control system for a surgical microscope comprises, inter alia, a microscope wherein its optics have been calibrated by focusing the optics on a point having known three-dimensional coordinates, and wherein focusing data has been transferred to a computer unit while the computer unit maps the three-dimensional position of the microscope by means of cameras and reflectors attached to the microscope. While Cosman uses index markers on a microscope to enable the position of the microscope to be determined relative to the anatomy of the patient, neither Cosman nor Zanakis et al. have been found to have any discussion of calibrating the optics of the microscope as set forth in claim 17. For at least this reason, withdrawal of the rejection of claims 17 and 18 is respectfully requested.

Conclusion

In view of the foregoing, request is made for timely issuance of a notice of allowance.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By _____
Don W. Bulson, Reg. No. 28,192

1621 Euclid Avenue
Nineteenth Floor
Cleveland, Ohio 44115
(216) 621-1113

CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any paper or thing referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: MS AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: April 22, 2004

_____
Don W. Bulson

H:\152\DWB\SCHW\P\P0110\P0110USB.R03.wpd